SMALL NAVIGATION PROJECT

BUNKER HARBOR

MAINE

DETAILED PROJECT REPORT

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
WALTHAM, MASS.

JUNE 1966

U. S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS
424 TRAPELO ROAD
WALTHAM, MASS. 02154

ADDRESS REPLY TO:
DIVISION ENGINEER

REFER TO FILE NO. NEDED-R

17 June 1966

SUBJECT: Detailed Project Report for Small Navigation Project, Bunker Harbor, Gouldsboro, Maine

TO: Chief of Engineers
ATTN: ENGCW-PD

1. In accordance with ER 1165-2-14 there is submitted for review and comment an advance draft of the subject report.

2. Responsible officials of the State of Maine and the Town of Gouldsboro concur in the recommended project and have given firm indications that the requirements of local cooperation would be met. Formal assurances of participation will be obtained from the State and Town during preparation of final design for the project.

3. The plans and specifications will be prepared in accordance with the Detailed Project Report as approved. Funds in the amount of $11,500 for preparation of the plans and specifications and $82,000 for the Federal cost of construction will be required.

4. Formal comments of the Governor of Maine will be requested after approval of the advance draft.

Incl (12 Cys)
as

REMI O. RENIER
Colonel, Corps of Engineers
Acting Division Engineer

U. S. ARMY ENGINEER DIVISION. NEW ENGLAND
CORPS OF ENGINEERS
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BUNKER HARBOR, GOULDSBORO, MAINE

PERTINENT DATA

1. Purpose. - To provide an anchorage of sufficient depth to increase operating efficiency and reduce damages to the commercial fishing fleet in Bunker Harbor.

2. Location. - Situated 9 miles east of Bar Harbor, Maine, on the east side of Schoodic Peninsula in the Town of Gouldsboro, Maine.

3. Existing Project. - There is no Federal project at Bunker Harbor. There is an existing project at Corea Harbor, Gouldsboro, 3 miles east of Bunker Harbor, that provides for an anchorage basin 600 feet long by 400 feet wide, 8 feet deep.

4. Improvement Desired. - An anchorage 8 feet deep for locally based lobster boats in the inner harbor.

5. Recommended Improvement. - Dredging an anchorage of 3 acres, 6 feet deep in the inner harbor.

6. Estimated Costs. -

Dredging 6-foot anchorage 20,000 c.y. of ordinary material @ $3.00	$ 60,000
Contingencies	10,000
Engineering & Design	30,000*
Supervision & Administration	10,000
Construction Total	$110,000

*Includes $16,500 for project study costs.

Brought Forward	$110,000
Other Costs	
Public Landing*	5,000
Total Federal and Non-Federal Project Costs	$115,000

*Self-liquidating cost

7. Apportionment of First Cost

Federal:	
Corps of Engineers	110,000
Non-Federal:	
Public Landing**	5,000

**Self-liquidating

8. Annual Costs

Federal: Interest and Amortization (50 yrs @ 3-1/8% 0.03979 x $110,000)	$ 4,400
Maintenance: Anchorage	4,000
Total Annual Cost	$ 8,400

9. Benefits. - Benefits are expected to accrue to the commercial fishing fleet in the amount of $32,000 annually. No benefits would be realized by recreational craft.

10. Benefit-Cost Ratio. - 3.8 to 1.0.

11. Requirements of Local Cooperation. -

a. Provide, maintain, and operate without cost to the United States an adequate public landing or wharf open and available to all on equal terms, with depths alongside commensurate to the anchorage and mooring facilities as needed for transient and local craft.

b. Provide without cost to the United States all necessary lands, easements, and rights-of-way required for construction and subsequent maintenance of the project and for aids to navigation upon the request of the Chief of Engineers, including suitable areas determined by the Chief of Engineers to be required in the general public interest for subsequent disposal of spoil, and also necessary retaining dikes, bulkheads and embankments therefor or the costs of such retaining works.

c. Hold and save the United States free from damages that may result from construction and maintenance of the project.

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17 June 1966

DETAILED PROJECT REPORT
SMALL NAVIGATION PROJECT
BUNKER HARBOR, GOULDSBORO, MAINE

AUTHORITY

1. This Detailed Project Report is submitted pursuant to authority contained in Section 107 of the River and Harbor Act of 1960, as amended. Specific authority was provided by 1st Indorsement dated 10 February 1965 from the Chief of Engineers in a reply to a letter dated 4 February 1965 from the Division Engineer, New England Division, Subject: "Section 107 Investigation - Bunker Harbor, Gouldsboro, Maine".

PURPOSE AND EXTENT OF STUDY

2. This study was made to determine the need and economic justification for a small Federal navigation improvement in Bunker Harbor. A public hearing was held at Prospect Harbor, Gouldsboro, Maine, on 14 October 1964 to determine the improvement desired by local residents. In preparing this report, information has been obtained from commercial statistics, available maps, and other data pertaining to the area. A detailed hydrographic survey, consisting of soundings and random probings was made in September and October 1965 to determine the extent and character of material to be dredged. In view of the presence of rock in the study area, several foundation borings were taken in March and April 1966 to supplement previous data and to serve as a basis for development of a plan of improvement. Local, State and other Federal agencies were consulted during the study and their views are included in this report.

DESCRIPTION

3. Bunker Harbor is one of several small harbors located along the rocky eastern shore of Schoodic Peninsula in the Town of Gouldsboro, about 9 miles east of Bar Harbor, Maine. The other harbors from south to north are Wonsqueak, Birch, and Prospect Harbors, all of which are used by local fishing craft.

4. The approach to the outer harbor from the open ocean is partly obstructed by ledges awash at low water. The unmarked entrance channel has a depth of 25 feet. The inner harbor is a narrow inlet of approximately 7 acres, extending inland in a northwesterly direction about 700 yards. This inner harbor is well sheltered in all directions from wind and wave action, forming a good anchorage for small craft. There is practically no fresh water inflow.

5. Mean tide range is 10.5 feet. The spring tide range is 12.1 feet. The harbor is shown on U. S. Coast and Geodetic Charts 305 and 1202, U. S. Geological Survey Map (Bar Harbor Quadrangle), and on the maps accompanying this report.

TRIBUTARY AREA

6. The area immediately tributary to Bunker Harbor is a sparsely settled section of the Town of Gouldsboro, consisting of a small fishing community on the west bank of the inlet. In the 10 year period 1950-1960, the population of Gouldsboro decreased 9 percent from 1168 to 1100. Hancock County has been declared an area of persistent and substantial unemployment by the Area Redevelopment Administration. Lobster fishing plays a very important part in the local economy. Herring seiners use the harbors seasonally. Herring carriers gather fish, during high water stages and land the fish at other ports. The harbor is not used by recreational craft as better facilities for this class of traffic are available at the nearby ports of Winter, Prospect and Corea Harbors.

7. There are no rail connections to the town. The nearest railroad station, a branch of the Maine-Central Railroad, is located at Ellsworth, 31 miles northwest. A road leading from

Winter Harbor around Schoodic Peninsula to Prospect Harbor passes along the west shore of Bunker Harbor and provides connection with U. S. Route 1 at Gouldsboro Center, 9 miles north.

BRIDGES AFFECTING NAVIGATION

8. There are no bridges in the vicinity of the waterway under consideration for improvement.

EXISTING PROJECTS

9. There is no existing Federal project at Bunker Harbor. Corea Harbor, located 3 miles east of Bunker Harbor and just west of the entrance to Gouldsboro Bay, is the nearest completed Federal project. This project, completed in 1938, provides for an anchorage basin 600 feet long, 400 feet wide, 8 feet deep. Federal expenditures for the anchorage including maintenance dredging done in 1953 total $92, 000.

OTHER IMPROVEMENTS

10. No improvements for general navigation, other than construction of fishing wharves by local interests, have been made at Bunker Harbor.

TERMINAL AND TRANSFER FACILITIES

11. There are five small fishing wharves in use along the west bank and at the head of the inner harbor, all bare at low water. Several new wharves are under construction and at least three more are in the planning stage. There is no publicly owned wharf, but gasoline and water are available at two of the docks.

IMPROVEMENTS DESIRED

12. A public hearing was held at Prospect Harbor, Gouldsboro, Maine, on 14 October 1964 to determine the nature and extent of improvements desired by local interests. The hearing was attended by about 45 people including representatives of the State and local governments, fishing industry, business interests and other interested townspeople.

13. Local interests desire dredging in the harbor to enlarge and deepen the existing anchorage. Most of the fishing boats are crowded together in deeper water at the entrance and are frequently damaged through collision or by grounding out during low tide. The desired improvement would eliminate damages and tidal delays resulting in increased fish catch.

EXISTING AND PROSPECTIVE COMMERCE

14. At the present time lobsters are the only commercial product landed by approximately 17 boats which operate from the harbor year-round. In 1963, 102,850 pounds of lobsters were landed by these boats and purchased by two local dealers. Two lobster pounds are located in the harbor, one with a capacity of 60,000 pounds and one with a capacity of 25,000 pounds. A. C. McLoon Lobster Co., the firm which presently owns the lobster pounds, operates a 76-foot lobster smack drawing 7-1/2 feet of water which makes regular collections from these and other pounds.

15. Local interests claim that if the present anchorage is enlarged, there would be a considerable increase in the lobster catch by the 17 boats that comprise the existing fleet. The National Park Service plans to include Wonsqueak Harbor, located on the west side of Spruce Point, in future park land development. The loss of Wonsqueak Harbor for use by the lobstermen, would result in the transfer of six boats now based there to Bunker Harbor where they would be able to fish year-round if the harbor were improved to provide room for these craft. Two boats now located at Birch Harbor are expected to shift to Bunker Harbor and at least three new boats will be added to the existing fleet if the harbor were improved. Several local residents plan to fish for hake in the near future delivering their catches to Corea Harbor.

VESSEL TRAFFIC

16. There are no statistics available on vessel trips in the waterway. At present there are 17 lobster boats operating year-round from the harbor. Herring seiners also use the harbor seasonally when the fish are running. These fish are picked up by herring carriers during high water periods and landed at other ports. The improvement desired would provide room for expanding the fishing fleet and result in increased vessel traffic.

DIFFICULTIES ATTENDING NAVIGATION

17. The inner harbor is used an an anchorage area by the local lobster fishing fleet. The harbor has filled in considerably over recent years to that there is insufficient depth of water for safe anchorage during low tide cycles. Part of the anchorage is exposed mud flat at low water and on low-run tides all but two of the 17 boats ground out. These lobster boats are crowded together in deeper water near the entrance and in storms sustain considerable hull damage due to close quarters. On occasion a severe undertow surges into the shallow anchorage, causing boats to bang their keels into the mud or on mooring blocks. There have been a number of instances of boats winding their moorings and going adrift.

18. The present tidal delays reduce fishing time, resulting in a loss of production. Because the wharves are surrounded by mud flats at low tide, fishermen must push bait, gear and fuel in skiffs across the flats to their boats, or wait several hours for the tide to come in sufficiently, before they can begin their fishing for the day. The same problem is frequently encountered when the lobstermen return with their catch.

19. The crowded anchorage and lack of depth has hampered the operations of the McLoon Lobster Company. A lobster smack visits the harbor frequently, transporting lobsters to and from the pounds and keeping the harbor ice-free during the winter months. Because of existing tidal delays and overcrowded conditions, the lobster smack has difficulty in reaching the lobster pounds. When this occurs the smack must proceed to Rockland to unload, resulting in a loss of lobsters.

20. In addition, A. C. McLoon and Co., recently installed a dockside gasoline facility at Bunker Harbor. This company has an 81-foot tanker with a draft of 10-1/2 feet which would normally service this facility. The tanker, after a single trial visit, has had to give up servicing the facility, pending improvement of the harbor.

WATER POWER AND OTHER SPECIAL SUBJECTS

21. There are no problems pertaining to water power, flood control, pollution or related subjects. The improvement contemplated would have no adverse effect on fish and wildlife resources.

PLAN OF IMPROVEMENT

22. The improvement desired by local interests is an anchorage area, 8 feet deep, within the inner harbor. The plan of improvement considered and recommended would provide an anchorage area totalling 3 acres, 6 feet deep. This is the maximum area and depth considered to be available for improvement within the harbor to meet the needs of navigation, without involving expensive rock removal. The majority of fishing vessels that are expected to use the waterway draw about 4 feet of water. There are some deeper draft herring carriers that might use the harbor if greater depth were available, however, the benefits that would be realized by these vessels would not be sufficient to justify the additional cost of dredging and rock removal.

23. Local interests have indicated that the plan of improvement would meet their needs and that the associated requirements of local cooperation would be met. (See Appendix C)

SHORELINE CHANGES

24. The proposed dredging in Bunker Harbor would have no adverse effect on the shoreline as the entire harbor is surrounded by ledge.

REQUIRED AIDS TO NAVIGATION

25. The Commander, First Coast Guard District, has been consulted and advised that no aids to navigation would be required in the harbor (Appendix B).

ESTIMATE OF FIRST COSTS

26. An estimate of the first cost of construction of the selected plan of improvement has been made. The estimate is based on soundings and random probings taken during a hydrographic survey made in September and October 1965. Borings to determine the type of material to be removed were taken in March and April 1966. Federal construction under the proposed plan would involve the removal of mud, sand and gravel by bucket dredging with scow disposal on an approved offshore dumping ground. Local interests would be responsible for construction of the public landing. Dredging quantities

are based on inplace measurements and provide for removal to a depth of six feet below mean low water, plus an allowance of one foot overdepth with side slopes one vertical to three horizontal. Unit prices used for dredging costs are based on those prevailing in January 1966 for similar work. The estimate of first cost, including an allowance for contingencies is as follows:

PROJECT COST ESTIMATE

Cost Acct. No.	Item	Project Features (6 ft. anchorage)
09	Dredging (ordinary materials) Quantity 20,000 c.y. Unit Price $3.00	$ 60,000
	Contingencies	10,000
	TOTAL	$ 70,000
30	Engineering & Design	30,000*
31	Supervision & Administration	10,000
	Total Construction Cost	$110,000
	Public Landing (Self-liquidating)	5,000
	Total Project Cost (Federal and Non-Federal)	$115,000

*Includes project study costs of $16,500

ESTIMATE OF ANNUAL CHARGES

27. Annual charges for the navigation improvements have been computed on the basis of a 50-year project life with a Federal interest rate of 3-1/8 percent. Maintenance costs are based on an average annual shoaling rate of 1300 cubic yards.

28. The cost of a public landing and berthing areas are considered self-liquidating and are not included in the estimate of annual charges.

ANNUAL CHARGES

Interest & Amortization ($110,000) (0.03979)	$4,400
Maintenance Dredging (1,300 c.y.) ($3.00/c.y.)	4,000
Total Project Annual Charges	$8,400

ESTIMATE OF BENEFITS

29. Local lobstermen estimate that each of the 17 boats using the harbor year round suffer between $300 and $400 damage each year because of grounding out, pounding on the bottom and smashing into other boats. If dredging were accomplished the transferred boats from other harbors and new boats expected to be added would still leave a somewhat crowded anchorage. However, the damages could be reduced by 50 percent which would represent a savings of at least $2500 a year.

30. It is estimated that each fisherman loses over 200 man-hours a year because of tidal delays. For the 17 fishermen now using Bunker Harbor this means a total of 3,400 man-hours lost annually. Local fishermen, basing their estimates on the number of traps they can tend in an hour (approximately 40) and on a minimum average catch of 1/2 pound per trap, estimate that at least 20 pounds of lobsters could be produced per man during these lost hours. This amounts to 68,000 additional pounds of lobsters worth $40,800, using 60 cents a pound as the average price received by the fishermen for their catch. Assuming that only one half of the fishermen set out additional traps during this added fishing time, the additional catch would amount to 34,000 pounds worth $20,400. With additional operating costs of 40 percent of the value of the catch, the benefit is estimated at $12,200.

31. The six boats based at Wonsqueak Harbor would move to Bunker Harbor at least during the winter months if the anchorage is enlarged. These fishermen now must haul out their boats from November 1 to April 1 because undertow and icing conditions make Wonsqueak Harbor completely unusable during the winter. By fishing these winter months an additional 24,000 pounds of lobsters

worth approximately $14,400 could be landed. Two boats transferring from Birch Harbor would catch 8,000 pounds valued at $4,800 annually. With additional costs of 40 percent, the net value of the benefits for these boats are $8,600 and $2,900 annually.

32. It is estimated that three new boats would be added to the fleet and could be expected to land 24,000 pounds of lobsters annually, valued at $14,400. On the basis of additional costs for a new boat of 60 percent of the value of the catch, the annual benefit would be $5,800.

33. Additional benefits would accrue to the local fishing fleet through more efficient operation of the two lobster pounds. Many man-hours and lobsters are lost because tidal delays and overcrowded anchorage prevent the lobster smack from reaching the pounds. On occasion, the smack has arrived at Bunker Harbor with a full load of lobsters, but has had to turn back and proceed to Rockland further down the coast. Herring carriers, arriving to pick up fish caught at Bunker Harbor, can enter only at high water. Otherwise, they must either stand by outside in the open bay or seek shelter in some deeper harbor miles away. The increased anchorage area would allow visiting vessels to remain overnight or for the duration of storms resulting in savings to fishermen in adjacent waters.

34. Use of the harbor by pleasure craft, except as a temporary refuge, is doubtful in view of the limited facilities and attractions offered. No benefits have been evaluated.

35. A summary of estimated annual benefits from the proposed project is as follows:

Summary of Benefits

Reduction in boat damage	$ 2,500
Increased lobster catch from elimination of tidal delays to the existing fleet	12,200
Increased catch for boats transferred from Wonsqueak Harbor and Birch Harbor	11,500
New boats	5,800
TOTAL	$32,000

COMPARISON OF BENEFITS AND COSTS

36. A comparison of the estimated annual benefits of $32,000 and the estimated annual charges of $8,400 results in a benefit-cost ratio of 3.8 to 1.

PROPOSED LOCAL COOPERATION

37. The benefits to be derived from this improvement of Bunker Harbor are entirely general in nature and therefore no local cash contribution toward the first cost of construction should be required. Local interests should be required to:

(a) Provide, maintain, and operate without cost to the United States an adequate public landing or wharf open to all on equal terms, with depth alongside commensurate to the anchorage and mooring facilities as needed for transient and local craft.

(b) Provide without cost to the United States all necessary lands, easements, and rights-of-way required for construction and subsequent maintenance of the project and for aids to navigation upon request of the Chief of Engineers, including suitable areas determined by the Chief of Engineers to be required in the general public interest for subsequent disposal of spoil; also necessary retaining dikes, bulkheads, and embankments therefor or the costs of such retaining works.

(c) Hold and save the United States free from damages that may result from construction and maintenance of the project.

38. Local authorities have indicated that the above requirements of local cooperation could be met (See Appendix C).

COORDINATION WITH OTHER AGENCIES

39. All Federal, State and local agencies that might have an interest in the improvement of Bunker Harbor were notified of the public hearing held at Prospect Harbor. A conservation and development report has been made by the U. S. Fish and Wildlife Service in cooperation with the Maine Department of Sea and Shore Fisheries and Department of Inland Fisheries and Game. Their report is contained in Appendix A of this report. The comments of the State of Maine Port Authority and the Town of Gouldsboro are contained in Appendix C.

SCHEDULE FOR DESIGN AND CONSTRUCTION

40. It is estimated that preparation of contract plans and specifications for the project will require 4 months. The estimated

cost is $11,500. Construction of the project can be accomplished under a single contract to be completed in a 3 month period. Expenditures are as follows:

a. Allocated to Date:

Reconnaissance Report	$ 4,000
Detailed Project Report	12,500

b. Required to Complete:

Plans and Specifications	11,500
Construction, Engineering during Construction, Supervision and Administration	82,000
Total Cost (Corps of Engineers)	$110,000

OPERATION & MAINTENANCE

41. Maintenance of the improvement will be the responsibility of the United States. The proposed plan of improvement will enlarge the existing anchorage area of the harbor to the greatest extent possible without removal of ledge. It is estimated that a shoaling rate of two tenths of a foot per year may result. On this basis it is estimated that maintenance would be required every 10 years involving the removal of about 13,000 cubic yards or 1300 cubic yards per year. The average annual cost of maintenance is estimated at $4,000.

CONCLUSIONS

42. Detailed study indicates that a navigation improvement at Bunker Harbor, Gouldsboro, Maine under Section 107 of the 1960 River and Harbor Act is feasible and economically justified. The resulting benefits to the commercial fishing fleet are sufficient to warrant a Federal improvement project that would provide an anchorage of 3 acres, 6 feet deep, within the inner harbor. Local interests have indicated that the improvement meets their needs

and are willing and able to meet the requirements of local cooperation. All agencies known to have an interest have been consulted and have expressed no objection to the improvement.

RECOMMENDATION

43. The Division Engineer recommends that a Federal navigation project at Bunker Harbor, Gouldsboro, Maine be authorized by the Chief of Engineers under the provisions of Section 107 of the River and Harbor Act of 1960, to provide an anchorage of 3 acres, 6 feet deep. The total Federal project cost is estimated at $110,000. Annual maintenance costs are estimated at $4,000. This recommendation is made subject to the condition that local interests:

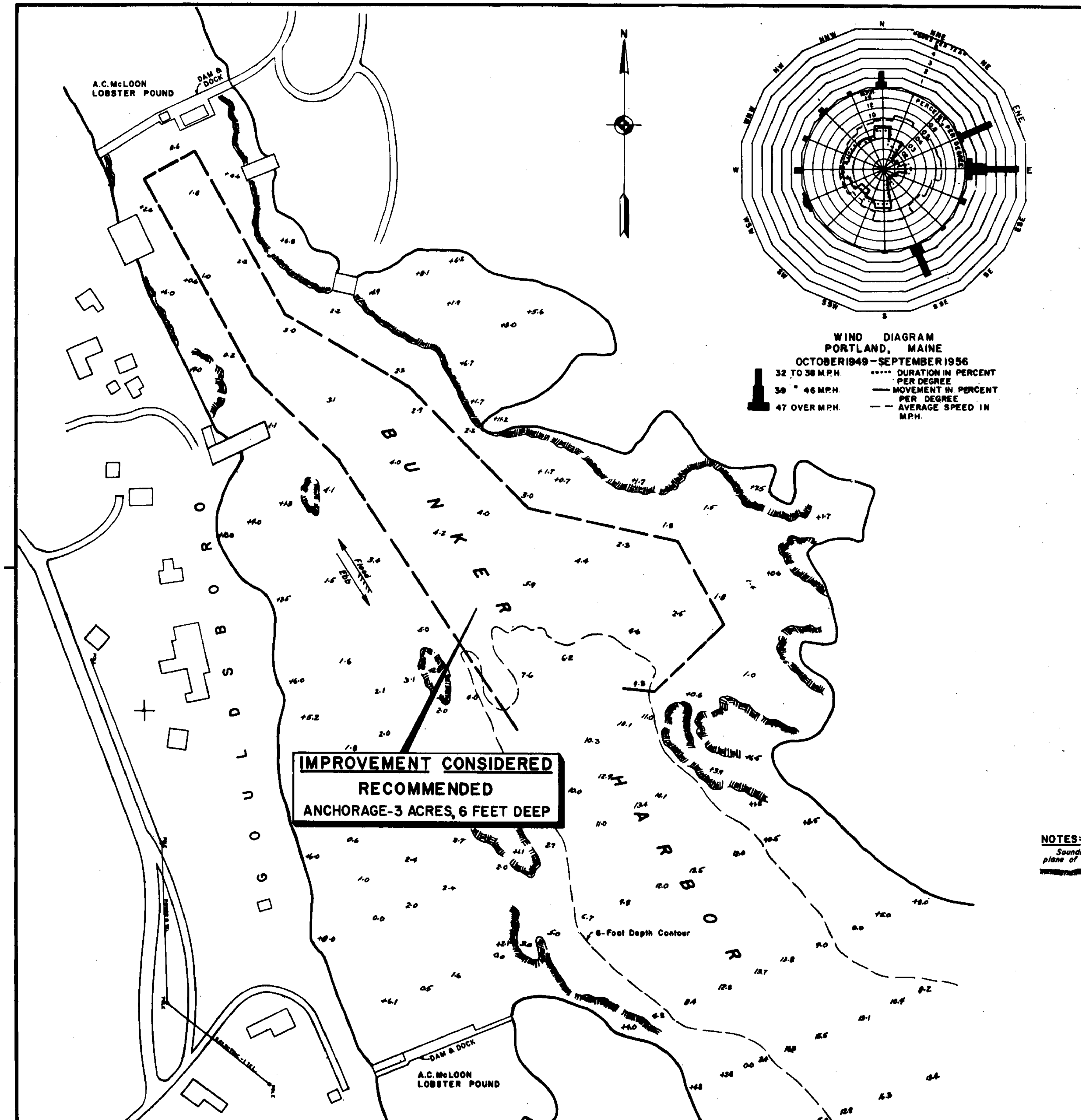
a. Provide without cost to the United States all necessary lands, easements and rights-of-way needed for construction and subsequent maintenance of the project and for aids to navigation upon request of the Chief of Engineers, including suitable areas determined by the Chief of Engineers to be required in the general public interest for subsequent disposal of spoil, and also necessary retaining dikes, bulkheads, and embankments therefor, or the cost of such retaining works.

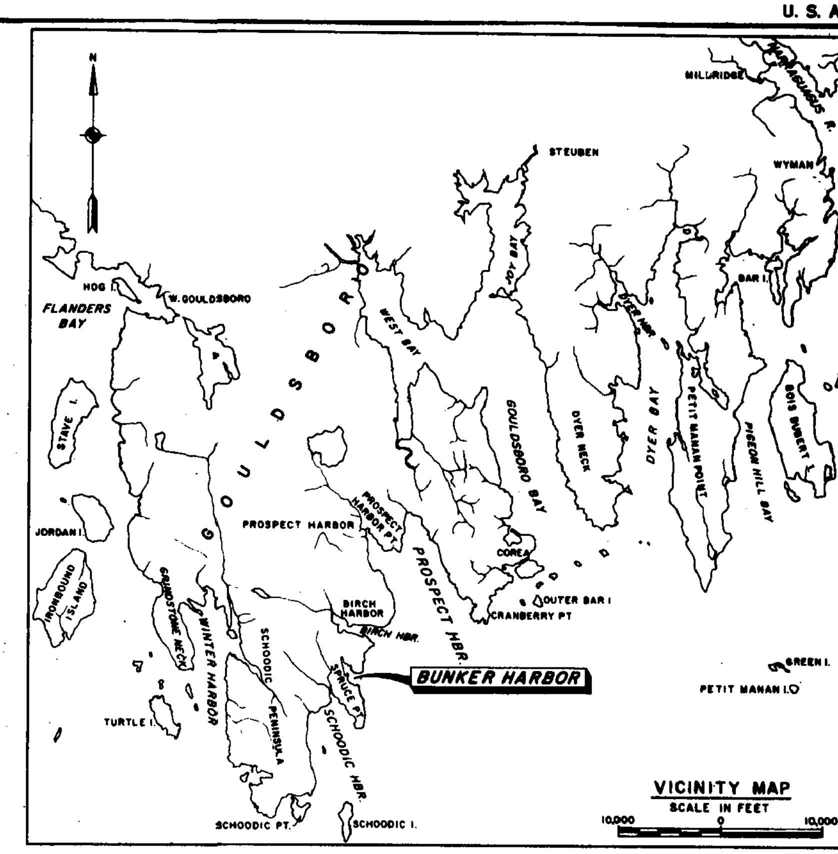
b. Hold and save the United States free from damages that may result from construction and maintenance of the project.

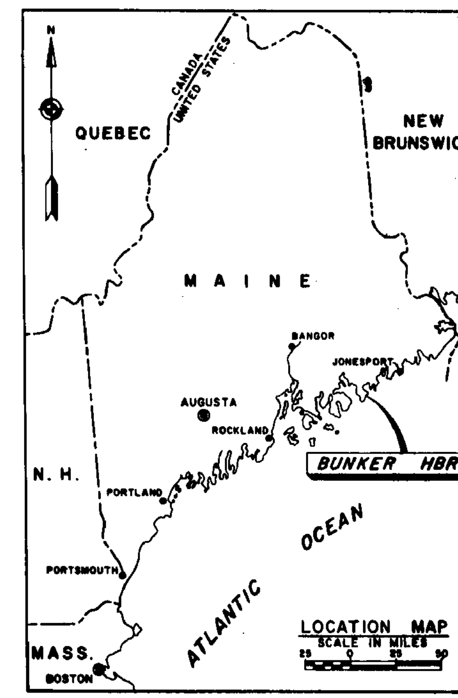
c. Provide and maintain without cost to the United States an adequate public landing or wharf open to all on equal terms, with depths alongside commensurate to the anchorage and mooring facilities as needed for transient and local craft.

4 Incls.
1. Maps - 2 Plates
2. Appendix A - U.S. Fish & Wildlife Service Report
3. Appendix B - U. S. Coast Guard Report
4. Appendix C - Letters by Local Interests

REMI O. RENIER
Colonel, Corps of Engineers
Acting Division Engineer







NOTES:

Soundings are in feet and tenths and are referred to the plane of Mean Low Water.

Approx. edge of bedrock exposure.

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS, WALTHAM, MASS.

BUNKER HARBOR
MAINE

SHEET 1 OF 1

SCALE IN FEET
50' 0 50' 100'

APPROVED: [signature]
CHIEF, ENGINEERING DIVISION

SUBMITTED: [signature]
CHIEF, PLANNING AND REPORTS BRANCH

[signature]
CHIEF, RIVER AND HARBOR SECTION

[signature]
PROJECT ENGINEER

DR. BY: A.D.C.
TR. BY: A.D.C.
CH. BY:

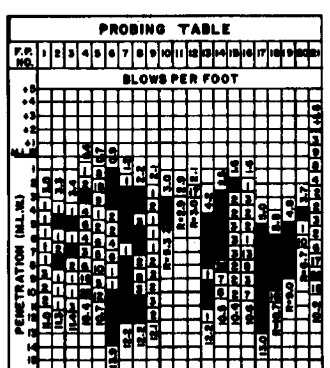
TO ACCOMPANY DETAILED PROJECT REPORT

DATED 17 JUNE 1966

FILE NO. 1730 D-9-3

LIST OF PROBINGS

NUMBER	DEPTH OF WATER (ELEVATION BELOW M.L.W.)	DEPTH OF PROBE (ELEVATION BELOW M.L.W.)	PENETRATION	MATERIAL	NUMBER	DEPTH OF WATER (ELEVATION BELOW M.L.W.)	DEPTH OF PROBE (ELEVATION BELOW M.L.W.)	PENETRATION	MATERIAL
1	2.0	11.5	9.5	Mud and Gravel	54	+1.7	+1.7	0.0	Open Face Ledge
2	1.0	6.0	5.0	Mud & Gravel to Ref.	55	+1.7	+1.7	0.0	Scattered Bldrs. to Ref.
3	+1.3	+0.9	0.4	Visible Ledge - Ref.	56	+1.7	+1.7	0.0	" " " "
4	1.8	7.6	5.8	Mud & Gravel to Ref.	57	+1.7	+1.7	0.0	Toe -Open Face Ledge
5	2.3	8.0	5.7	Mud from Gravel	58	+1.7	+1.7	0.0	" " " "
6	1.4	2.5	1.1	Refusal	59	+1.7	+1.7	0.0	" " " "
7	1.8	10.0	8.2	Mud to loose Gravel	60	+1.7	+1.7	0.0	Open Face Ledge
8	+2.1	+2.1	0.0	Visible Ledge	61	+1.7	+1.7	0.0	" " "
9	3.4	10.4	7.0	Mud	62	+1.7	+1.7	0.0	
10	+3.0	+2.9	0.1	Visible Ledge	63	+6.1	+6.1	0.0	
11	3.3	4.0	0.7	Refusal	64	+1.6	+1.6	0.0	
12	2.7	9.9	7.2	Mud and loose Gravel	65	+1.6	+1.6	0.0	
13	2.8	9.4	6.6	Mud & Gravel to Ref.	66	+1.5	+1.5	0.0	Open Face Ledge
14	3.9	14.8	10.9	Mud	67	+1.5	+1.5	0.0	" " "
15	4.1	14.7	10.6	Mud to Gravel	68	+1.5	+1.5	0.0	" " "
16	4.4	11.0	6.6	Mud to Gravel	69	+1.5	+1.5	0.0	Scattered Bldrs &Ref.
17	4.5	11.5	7.0	Mud to Sand to loose Gr.	70	+1.5	+1.5	0.0	" " " "
18	1.6	5.9	4.3	Mud to Refusal	71	0.6	10.6	10.0	Mud
19	5.7	13.3	7.6	Mud	72	1.9	10.8	8.9	Mud, Gravel
20	5.5	12.3	6.8	Mud	73	1.8	7.8	6.0	Mud,Gravel, Refusal
21	6.1	14.4	8.3	Mud	74	1.8	10.8	9.0	Mud, Gravel
22	1.3	10.2	8.9	Mud to Gravel	75	1.8	9.1	7.3	" "
23	2.0	10.2	8.2	M to Gr. to loose R to M.	76	2.2	10.3	8.1	" "
24	8.8	10.0	1.2	Mud	77	2.4	10.6	8.2	" "
25	9.8	17.3	7.5	Mud	78	2.3	11.6	9.3	" "
26	+0.2	0.5	0.3	Loose B and Ref.	79	2.2	11.3	9.1	Mud
27	0.9	3.9	3.0	Mud to Ref.	80	1.9	11.3	9.4	
28	10.0	10.0	0.0	—— ——	81	1.0	1.0	0.0	Refusal
29	8.1	10.9	2.8	Mud and Gravel	82	2.7	8.3	5.6	Mud,Gravel,Refusal
30	9.8	10.7	0.9	Mud to Refusal	83	0.3	4.3	4.0	" " "
31	+8.3	+8.3	0.0	Visible Ledge	84	0.1	11.0	10.9	" "
32	+2.0	+2.0	0.0	Open Face Ledge	85	2.0	4.3	2.3	Mud, Refusal
33	+2.0	+2.0	0.0	" " "	86	2.9	11.2	8.3	Mud
34	+2.0	+2.0	0.0	" " "	87	2.9	8.5	5.6	Mud, Refusal
35	+2.0	+2.0	0.0	" " "	88	3.2	10.4	7.2	Mud, Gravel
36	+1.9	+1.9	0.0	" " "	89	3.6	6.0	2.4	Mud,Gravel,Refusal
37	+1.9	+1.9	0.0	" " "	90	2.7	11.0	8.3	Mud,Gravel
38	+1.9	+1.9	0.0	" " "	91	3.5	8.2	4.7	Mud,Gravel,Refusal
39	+1.9	+1.9	0.0	" " "	92	0.3	4.0	3.7	Mud, Gravel, Refusal
40	+1.8	+1.8	0.0	" " "	93	0.8	9.5	8.7	Mud, Gravel
41	+4.6	+4.6	0.0	" " "	94	4.1	10.1	6.0	" "
42	+1.7	+1.7	0.0	" " "	95	2.5	10.2	7.7	" "
44	+1.7	+1.7	0.0	" " "	96	1.3	7.2	5.9	Mud,Gravel,Refusal
45	+1.7	+1.7	0.0	" " "	97	1.7	10.2	8.5	Mud, Gravel, Clay
46	+6.7	+6.7	0.0	" " "	98	1.5	4.9	3.6	Mud, Refusal
47	+1.7	+1.7	0.0	" " "	99	1.5	10.2	8.7	Mud, Gravel, Mud
48	+1.7	+1.7	0.0	" " "	100	1.9	9.2	7.3	Mud,Gravel,Refusal
49	+1.7	+1.7	0.0	" " "	101	10.4	13.7	3.3	Mud
50	+1.7	+1.7	0.0	Scattered Bldrs to Ref.	102	9.3	9.3	0.0	Refusal
51	+1.7	+1.7	0.0	" " " "	103	11.2	14.8	3.6	Mud, Gravel
52	+1.7	+1.7	0.0	" " " "					
53	+1.7	+1.7	0.0	Open Face Ledge					



Probings made by hammering 1 3/8" drill rod with 350 lb. hammer falling about 18".

Penetration by weight of tools alone indicated by shading.

Refusal is designated "R" and is 50 blows with no appreciable penetration.

LEGEND

Approx. edge of bedrock exposure.
- P-37 Survey probings
- FP-16 FD probings
- FD-4 Borings

LEGEND FOR GRAPHIC LOGS

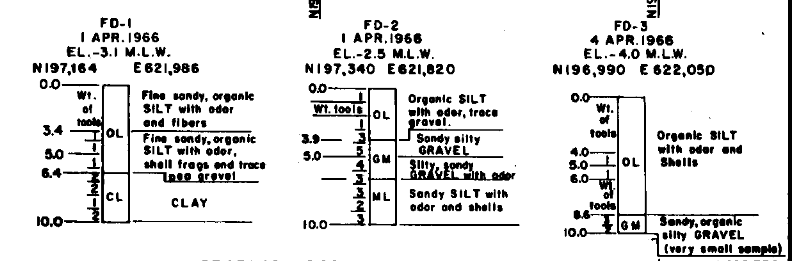
FD-1 — Test boring designation
1 APR. 1966 — Date exploration completed
EL.-2.3 M.L.W. — Mean Low Water elevation of top of boring

OL — Group letter symbol according to Unified Soil Classification System

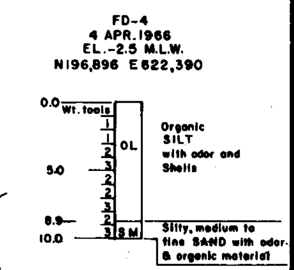
5 — Number of blows per foot of penetration using a 300-350 pound hammer falling freely an average of 18 inches on a standard sample spoon equipped with a bevelled and sharpened drive shoe (see note below)

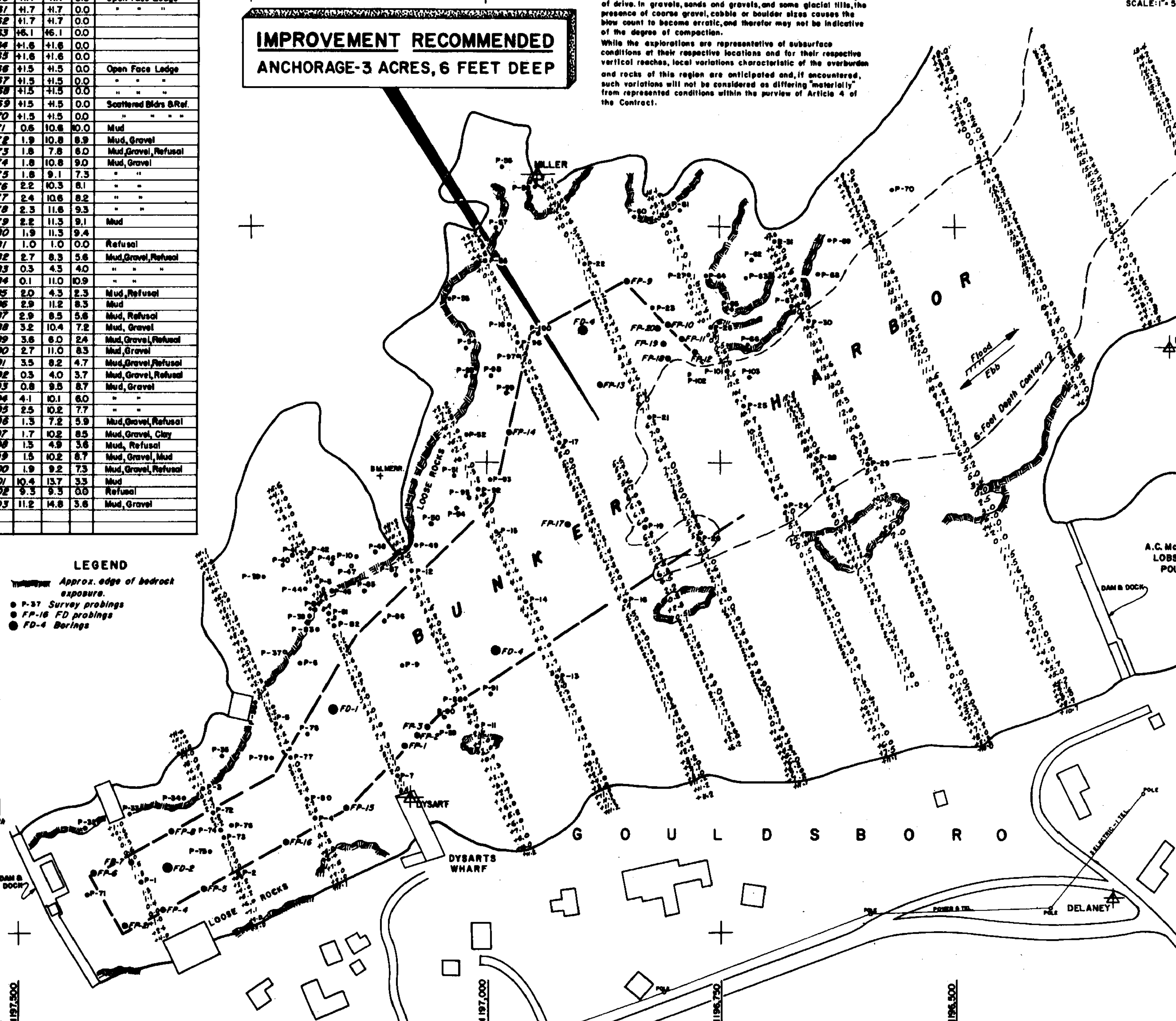
Normal length of continuous drive of sampling spoon is 5.0 feet. Penetration resistance of sampling spoon increases with length of drive, and blow counts, therfore, generally increase correspondingly except where distinct changes in material occur within the length of drive. In gravels, sands and gravels, and some glacial tills, the presence of coarse gravel, cobble or boulder sizes causes the blow count to become erratic, and therefor may not be indicative of the degree of compaction.

While the explorations are representative of subsurface conditions at their respective locations and for their respective vertical reaches, local variations characteristic of the overburden and rocks of this region are anticipated and, if encountered, such variations will not be considered as differing "materially" from represented conditions within the purview of Article 4 of the Contract.



GRAPHIC LOGS
SCALE: 1" = 5'





NOTES:

Soundings are in feet and tenths and are referred to the plane of Mean Low Water.

Hydrography and topography from survey of Sept. and Oct. 1965 by E. Byram. March 1966 by C. Daly.

B.M. Merriam is a chiseled □ on Point Ledge, across the harbor from Dysarts wharf, approx. 6 feet from the edge of the woods. El. above M.L.W. 16.20.

Probings were obtained by using water jetted through a 1/2" pipe by 2 men.

Coordinates are on the Maine Mercator Transverse System, East Zone.

Field books, R&H. 2108, 2375, 2376.

U.S. ARMY ENGINEER DIVISION, NEW ENGLAND
CORPS OF ENGINEERS, WALTHAM, MASS.

BUNKER HARBOR, MAINE

SURVEY MAP

SHEET 1 OF 1 — SCALE IN FEET 50' 0 50' 100' — DECEMBER 1965

APPROVED: [signature] — DIVISION ENGINEER
SUBMITTED: [signature] — CHIEF, PLANNING AND REPORTS BRANCH
[signature] — CHIEF, RIVER AND HARBOR SECTION
[signature] — PROJECT ENGINEER
DR. BY: A.J.H. A.D.C. — TR. BY: A.J.H. A.D.C. — CH. BY:

TO ACCOMPANY DETAILED PROJECT REPORT
DATED: 17 JUNE 1966
FILE NO. 1729 D-9-3

APPENDIX A

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
59 Temple Place
Boston, Massachusetts 02111

April 6, 1965

Division Engineer
New England Division
U.S. Army Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Sir:

This letter is our conservation and development report on the Bunker Harbor, Gouldsboro, Maine, navigation study, which was authorized under Section 107 of the River and Harbor Act approved July 14, 1960. This report is prepared under authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661-666 inc.), in cooperation with the Maine Department of Sea and Shore Fisheries and Department of Inland Fisheries and Game. These agencies concurred in the report as indicated by letters dated March 24, 1965, and April 1, 1965, respectively.

It is our understanding that the project will involve dredging to enlarge and deepen the existing anchorage in Bunker Harbor. The improved anchorage will be about four acres, irregularly shaped, and eight feet deep.

Bunker Harbor is a small narrow cove bounded by ledges and somewhat protected by ledges at its entrance. The small fishing village of Bunker is situated on the high ground west of the cove.

Significant commercial fishery resources are associated with the harbor with the lobster being the principal species. The 17 lobster boats based in the harbor landed 102,850 pounds of lobster in 1963. The McLoon Lobster Company operates two lobster pounds in the harbor with capacities of 60,000 and 25,000 pounds, respectively.

Herring seiners also use the harbor seasonally when the fish are running. Herring carriers pick up the fish from the seiners during high water periods and land the fish at other ports.

No wildlife or sport fishery values are associated with the project.

Shoal water conditions in the harbor result in overcrowding. Because of overcrowding, vessels frequently are damaged by banging together. Boat damages are also caused by grounding during low tides while at anchorage.

Since there is a lack of sufficient depth of water in the harbor during most tide conditions, the lobster fishermen are plagued with tidal delay problems. It is a common practice for the fishermen to haul their gear and fuel across mud flats to their boats if they wish to maintain a regular schedule. This is an extremely time consuming method of preparing a boat for a new day's trip. The same problem is frequently encountered when the fishermen return with their day's catch. The only other alternative is to wait for the tide to come in sufficiently. At times this means a wait of several hours. Considerable trap-tending (fishing) time is lost as a result of delays caused by shoal harbor conditions and grounding of the lobster boats.

Harbor improvements will benefit the existing 17 lobster boats by eliminating tidal delays and by reducing the time lost for repairs to damaged boats, thus allowing additional fishing time. Improvements will also attract additional boats to the harbor and new boats will be added to the lobster fleet.

The existing 17 boats will land an additional 34,000 pounds of lobster annually, valued at $20,400. It is expected that six boats will transfer from Wonsqueak Harbor and two boats from Birch Harbor, for a total of eight transfer boats. By increasing their fishing time during the winter months and avoiding tidal delays, the six boats are expected to increase their catch by 24,000 pounds valued at $14,400, and the two boats by 8,000 pounds, valued at $4,800 annually. Three new boats will be added to the fleet and are expected to land 24,000 pounds of lobster annually, valued at $14,400. The total benefits to the lobster fleet would be an increased catch of 90,000 pounds, valued at $54,000 annually.

A lobster smack which brings lobsters into the harbor from other harbors and coves has difficulty in reaching the lobster pounds at times because of existing tidal delays and the overcrowded anchorage. On occasions, losses of lobsters occurred when the smack could not reach the lobster pounds in Bunker Harbor and has had to proceed to Rockland. The harbor improvement will be a benefit to the lobster smack by eliminating unexpected delays and subsequent losses of lobsters. It is not possible to attribute a dollar value to this benefit.

In addition, an improved harbor will benefit the herring fishery. Under existing conditions, two herring carriers pick up from the seiners herring caught in Bunker Harbor and land the herring elsewhere. Herring which is used for bait by lobster fishermen and feed by the lobster pound operators must presently be trucked into the area. The improvement will allow the carriers to land the herring at Bunker Harbor. Presently, herring used as bait by the lobstermen and as feed at the lobster pound amounts to 782,000 pounds annually and is valued at $16,000. It is anticipated that the annual benefit to the herring fishery will be this amount if the harbor is improved.

Dredging in this area will have no direct effect on fish or wildlife. Spoil deposition will have no effect on fish or wildlife provided it is deposited on land adjacent to the harbor. Spoiling at sea should be coordinated with the Maine Department of Sea and Shore Fisheries and this Service.

Therefore, it is recommended--

1. That any spoil disposal at sea be coordinated with the Maine Department of Sea and Shore Fisheries and this Service.

Please advise us if any changes in the planning of navigational improvements at Bunker Harbor are made.

Sincerely yours,

Richard E. Griffith

Richard E. Griffith
Regional Director
Bureau of Sport Fisheries and Wildlife

for Donald J. Acker

John T. Gharrett
Regional Director
Bureau of Commercial Fisheries

TREASURY DEPARTMENT
UNITED STATES COAST GUARD

Address reply to:
COMMANDER (o-1)
1ST COAST GUARD DISTRICT
1400 CUSTOMHOUSE
BOSTON, MASS. 02109

.11400
11 January 1966

From: Commander, First Coast Guard District
To: Division Engineer, U. S. Army Engineer Division, New England, Corps of Engineers, 424 Trapelo Road, Waltham, Mass. 02154

Subj: Bunker Harbor, Gouldsboro, Maine; Federal Navigation Improvements; study of

Ref: (a) U.S. Army Engineer Division, NE, ltr NEDED-R dtd 28 Dec 1965

1. The plan of improvement under consideration for Bunker Harbor has been reviewed. The location of the anchorage will not affect Coast Guard operations in the area.

2. No navigational aids will be required to mark the anchorage area.

H. A. Campbell Jr.
H. A. CAMPBELL, JR.
By direction

Encl: (1) Map - File No. 1729 D-9-3

APPENDIX C

Town of Gouldsboro
Maine

West Gouldsboro, Maine
May 4, 1966

File No. NEDED-R
Division Engineer
U. S. Army Corps of Engineers
424 Trapelo Road
Waltham, Mass. 02154

Dear Sir:

In reply to your letter of April 20, we feel that the proposed improvement for Bunkers Harbor would meet the needs of the local interests, and we are very sure that the town would meet the requirements (A), (B), and (C).

I enclose the two copies of the charts with proposed dumping areas marked.

If there is any additional information needed, we will be glad to supply it.

I want to thank you for all your efforts on behalf of this project. We sincerely appreciate it.

Very truly yours,

Byron P. Lyons

Chairman, Board of Selectmen

RONALD W. GREEN, COMMISSIONER

STATE OF MAINE
DEPARTMENT OF SEA AND SHORE FISHERIES
STATE HOUSE
AUGUSTA, MAINE 04330

May 6, 1966

Re: NEDED-R

Remi O. Renier
Colonel, Corps of Engineers
Acting Division Engineer
U. S. Army Engineer Division, N. E.
Corps of Engineers
424 Trapelo Road
Waltham, Massachusetts 02154

Dear Colonel Renier:

This is to acknowledge your letter of April 20 regarding the navigation needs at Bunker Harbor, Gouldsboro, Maine.

Representatives from this Department have worked closely with the Maine Port Authority, local interests, and members of the Corps of Engineers on this project. It is, therefore, our understanding that the proposed improvement will meet the needs of local interests and will be a very substantial benefit to the state's commercial fishing industry. It is also our understanding that local interests are prepared to meet the requirements of local cooperation for a Federal project.

Regarding possible spoil disposal sites, we believe that local interests have already provided the Corps of Engineers with a proposed offshore area. This Department will be happy to cooperate with the U. S. Fish and Wildlife Service in determining whether or not this proposed area would have any affect on the local fisheries resource, and in checking the location of other suitable spoil sites in the area.

Sincerely,

Ronald W. Green
Commissioner

cc: Edward Langlois, Jr.